WHAT IS CLAIMED IS:

1. A control system for a motor vehicle including an internal combustion engine and a motor connected to an output shaft of the internal combustion engine, comprising:

a controller that performs a start control for starting the internal combustion engine, wherein

the controller is adapted to, when the internal combustion engine is cranked by the motor and the speed of the internal combustion engine reaches a predetermined speed, stop the cranking by the motor and estimate an inertia value indicative of inertia that acts on a rotational element related to the output shaft after the stop of the cranking by the motor, and control the internal combustion engine based on the estimated inertia value such that the internal combustion engine runs at an idle speed.

2. The control system according to claim 1, wherein the inertia value is an inertia torque value indicative of inertia torque that acts on the rotational element, the inertia torque value corresponding to an idle control amount used for controlling the internal combustion engine to run at the idle speed.

3. The control system according to claim 2, wherein the controller is adapted to control the internal combustion engine using a control amount obtained by subtracting the inertia torque value from a target idle control amount after the stop of the cranking by the motor.

4. The control system according to claim 1, wherein the controller is adapted to estimate the inertia value based on temperature of the internal combustion engine.

5. The control system according to claim 4, wherein the controller is adapted to estimate the inertia value such that the inertia value becomes smaller as the temperature of the internal combustion engine becomes higher.

6. The control system according to claim 1, wherein

the motor vehicle is provided with an automatic transmission to be shifted between at least a neutral position and a drive position, which transmits power output from the output shaft to the side of a vehicle axle while automatically changing the speed of rotation, and

the controller is adapted to estimate the inertia value based on a shift position of the automatic transmission.

7. The control system according to claim 1, wherein the motor vehicle is provided with an automatic transmission to be shifted between at least a neutral position and a drive position, which transmits power output from the output shaft to the side of a vehicle axle while automatically changing the speed of rotation, and

the controller is adapted to estimate the inertia value based on an initial value of the inertia value corresponding to the shift position and a diminishing rate corresponding to the shift position.

8. The control system according to claim 7, wherein

the initial value, when the shift position is the neutral position, becomes smaller than when the shift position is the drive position, and

the diminishing rate, when the shift position is the neutral position, becomes larger than when the shift position is the drive position.

9. The control system according to claim 1, wherein the controller is adapted to prohibit learning of control amounts related to an idling operation of the internal combustion engine when the inertia value is estimated to be equal to or larger than a first reference value.

10. The control system according to claim 1, wherein the controller is adapted to stop driving of a given auxiliary when the inertia value is estimated to be equal to or larger than a second reference value.

11. The control system according to claim 1, wherein the controller is adapted to perform a feedback control such that the internal combustion engine runs at the idle speed.

12. The control system according to claim 1, wherein the predetermined speed is equal to one of the idle speed and an approximate value of the idle speed.

13. The control system according to claim 1, wherein the controller is adapted to perform the start control when a predetermined starting condition is fulfilled after a predetermined stopping condition has been fulfilled and the internal combustion engine has been automatically stopped.

14. A control system for a motor vehicle including an internal combustion engine and a motor connected to an output shaft of the internal combustion engine, comprising:

a controller for performing an automatic start/stop control of the internal combustion engine, wherein

the controller is adapted to, during an automatic start of the internal combustion engine, control the internal combustion engine such that the internal combustion engine runs at an idle speed, using a different control amount from that used when a start of the internal combustion engine is triggered by an operation of an operator.

15. A control system for a motor vehicle including an internal combustion engine and a motor connected to an output shaft of the internal combustion engine, comprising:

a controller for performing an automatic start/stop control of the internal combustion engine, wherein

the controller is adapted to control the internal combustion engine such that the internal combustion engine runs at an idle speed, using a first control amount until a predetermined time passes after the internal combustion engine has been started, and control the internal combustion engine such that the internal combustion engine runs at the idle speed, using a second control amount that is different from the first control amount, after the predetermined time has passed.

16. The control system according to claim 15, wherein the first control amount is smaller than the second control amount.

17. The control system according to claim 16, wherein the first control amount is a value obtained by subtracting a value equivalent to inertia that acts on a rotational element related to the output shaft from the second control amount.

18. A control system for a motor vehicle including an internal combustion engine and a motor connected to an output shaft of the internal combustion engine, comprising:

a controller that performs a transition control for controlling a transition from a state where power is output to the output shaft from the motor to a state where the internal combustion engine idles with the motor outputting no power to the output shaft, wherein

the controller is adapted to, when the speed of the internal combustion engine reaches a predetermined speed, stop the motor and estimate an inertia value indicative of inertia which acts on a rotational element related to the output shaft after the stop of the motor, and control the internal combustion engine based on the estimated inertia value such that the internal combustion engine runs at an idle speed.

19. The control system according to claim 18, wherein the controller is adapted to perform the transition control at the time of starting the internal combustion engine.

20. The control system according to claim 18, wherein

the motor is capable of generating electric power, and

the controller is adapted to perform the transition control at the time of stopping the motor when the motor is generating electric power using driving power from the output shaft.

21. The control system according to claim 1, wherein the motor vehicle comprises a hybrid vehicle which is able to run using driving power output from the motor to the output shaft.

22. A method for controlling a start of an internal combustion engine of a motor vehicle including a motor connected to the output of the internal combustion engine, wherein

the internal combustion engine is cranked by the motor,

the cranking by the motor is stopped when a speed of the internal combustion engine reaches a predetermined speed,

an inertia value indicative of inertia that acts on a rotational element related to the output shaft after the stop of the cranking by the motor is estimated, and

the internal combustion engine is controlled based on the estimated inertia value so as to run at an idle speed.

23. A method for controlling an automatic start of an internal combustion engine of a motor vehicle including a motor connected to the output of the internal combustion engine, wherein

the internal combustion engine, during an automatic start of the internal combustion engine, is controlled so as to run at an idle speed, using a different control amount from that used when a start of the internal combustion engine is triggered by an operation of an operator.

24. A method for controlling an automatic start of an internal combustion engine of a motor vehicle including a motor connected to the output of the internal combustion engine, wherein

the internal combustion engine is controlled so as to run at an idle speed using a first control amount until a predetermined time passes after the internal combustion engine has been started,

the internal combustion engine is controlled so as to run at the idle speed using a second control amount that is different from the first control amount, after the predetermined time has passed.

25. A method for controlling a transition of a start operation state of an internal combustion engine of a motor vehicle including a motor connected to an output shaft of the internal combustion engine from a state where power is output to the output shaft from the motor to a state where the internal combustion engine idles with the motor outputting no power to the output shaft, wherein

when the speed of the internal combustion engine reaches a predetermined speed, the motor is stopped and an inertia value indicative of inertia

that acts on a rotational element related to the output shaft after the stop of the motor is estimated, and

the internal combustion engine is controlled based on the estimated inertia value so as to run at an idle speed.